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1. MATERIAL should be original and not published elsewhere, in whole or in part.

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- (g) *Acknowledgements*
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Only generic and specific names should be underlined to indicate italics; all other marking up should be left to editor and publisher.

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The number of the figure should be lightly marked in pencil on the back of each illustration.

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FISCHER, P.-H., DUVAL, M. & RAFFY, A. 1933. Études sur les échanges respiratoires des littorines. *Archs Zool. exp. gén.* 74: 627-634.

KOHN, A. J. 1960a. Ecological notes on *Conus* (Mollusca: Gastropoda) in the Trincomalee region of Ceylon. *Ann. Mag. nat. Hist.* (13) 2: 309-320.

KOHN, A. J. 1960b. Spawning behaviour, egg masses and larval development in *Conus* from the Indian Ocean. *Bull. Bingham oceanogr. Coll.* 17 (4): 1-51.

THIELE, J. 1910. Mollusca: B. Polyplacophora, Gastropoda marina, Bivalvia. In: SCHULTZE, L. *Zoologische und anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Süd-Afrika* 4: 269-270. Jena: Fischer. *Denkschr. med.-naturw. Ges. Jena* 16: 269-270.

(continued inside back cover)

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A NEW SPECIES OF
MYOPHORELLA (BIVALVIA, TRIGONIIDAE) FROM
THE SUNDAY'S RIVER FORMATION,
SOUTH AFRICA

By
MICHAEL R. COOPER

Cape Town Kaapstad

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A NEW SPECIES OF *MYOPHORELLA* (BIVALVIA, TRIGONIIDAE)
FROM THE SUNDAY'S RIVER FORMATION, SOUTH AFRICA

By

MICHAEL R. COOPER

*Department of Geology, University of Oxford**

(With 2 figures)

[MS. accepted 22 December 1978]

ABSTRACT

The genus *Myophorella* Crickmay is recorded for the first time from southern Africa with the description of *M. oosthuizeni* sp. nov. from Upper Valanginian strata of the Sunday's River Formation.

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INTRODUCTION

The family Trigoniidae comprises a long-ranging group of bivalves which first appeared in the Upper Triassic and are today represented by a solitary genus, *Neotrigonia*, which is restricted to subtropical to temperate waters off the coast of Australia.

Although some workers have subdivided the family into a number of subfamilies (Van Hoepen 1929; Skwarko 1963) this concept has been rejected by other workers (Cox 1969). The great diversity of forms within the Trigoniidae suggests that the family may usefully be split into a number of subfamilies. However, the latter categories are typically phylogenetic concepts and, at present, very little evolutionary data have been presented to justify many of the suggested subdivisions.

The genus *Myophorella* Bayle (*in* Bayle & Zeiller 1878) first appeared in the Middle Jurassic (middle Lias) and finally became extinct during the Lower Cretaceous (Aptian), attaining its acme during the late Jurassic, at which time it attained a virtually cosmopolitan distribution.

SYSTEMATICS

Order TRIGONIOIDA Dall, 1889

Superfamily TRIGONIACEA Lamarck, 1819

Family **Trigoniidae** Lamarck, 1819

Genus *Myophorella* Bayle, 1878

Type species

Trigonia nodulosa Lamarck, 1801; by subsequent designation of Crickmay (1932).

* Present address: Queen Victoria Museum, Salisbury, Rhodesia.

Discussion

Cox (1969) included *Myophorella* (*Promyophorella*), *M. (Haidaia)*, *Scaphotrigonia*, *Clavotrigonia* and *Clavitrighonia* as junior subjective synonyms of *Myophorella* s.s., whilst *Pseudomyophorella* is considered a subgenus, distinguished by possessing radial ribs on the area. *Scaphitrigon* is based on a publisher's error of the genus *Scaphogonia*.

Myophorella (Myophorella) oosthuizeni sp. nov.

Fig. 1

Material

Five specimens in the collection of Mr R. Oosthuizen of Zwartskraal, Prince Albert.

Holotype

RO 300 (SAM-PCU5941) is designated as holotype, the remaining specimens are paratypes.

Etymology

For Mr Roy Oosthuizen, whose keen interest and diligent collecting has contributed greatly towards an understanding of the fossiliferous deposits of southern Africa.

Type locality

Zwartkops brick quarry, Port Elizabeth, in the sediments of the Sunday's River Formation, and thus of late Valanginian age.

Diagnosis

A late Valanginian species of *Myophorella* characterized by an unornamented escutcheon; regular, large, obliquely clavate tubercles on the inner and marginal carinae; fine, transverse liration of the area; the absence of tubercles defining the median longitudinal furrow of the area; flank costae which arise either at right angles to, or directed posteriorly so as to form an acute angle with, the marginal carina; the anterior set of costae are strongly curved, so as to terminate mostly along the anterior and anteroventral margin of the commissure; there is a break in the regularity of tuberculation of those costae terminating along the anteroventral commissure; the flanks are finely lirate.

Description

The shell is small, trigonally ovate, with the valves moderately inflated, and somewhat produced posteriorly. The umbones are moderately incurved and situated about one-fifth of the shell length from the anterior margin. The escutcheon is large, lanceolate, and extends almost the entire length of the dorsal margin of the shell. The inner carina is marked by regular, large, obliquely clavate tubercles increasing in size posteriorly, as well as converging posteriorly.

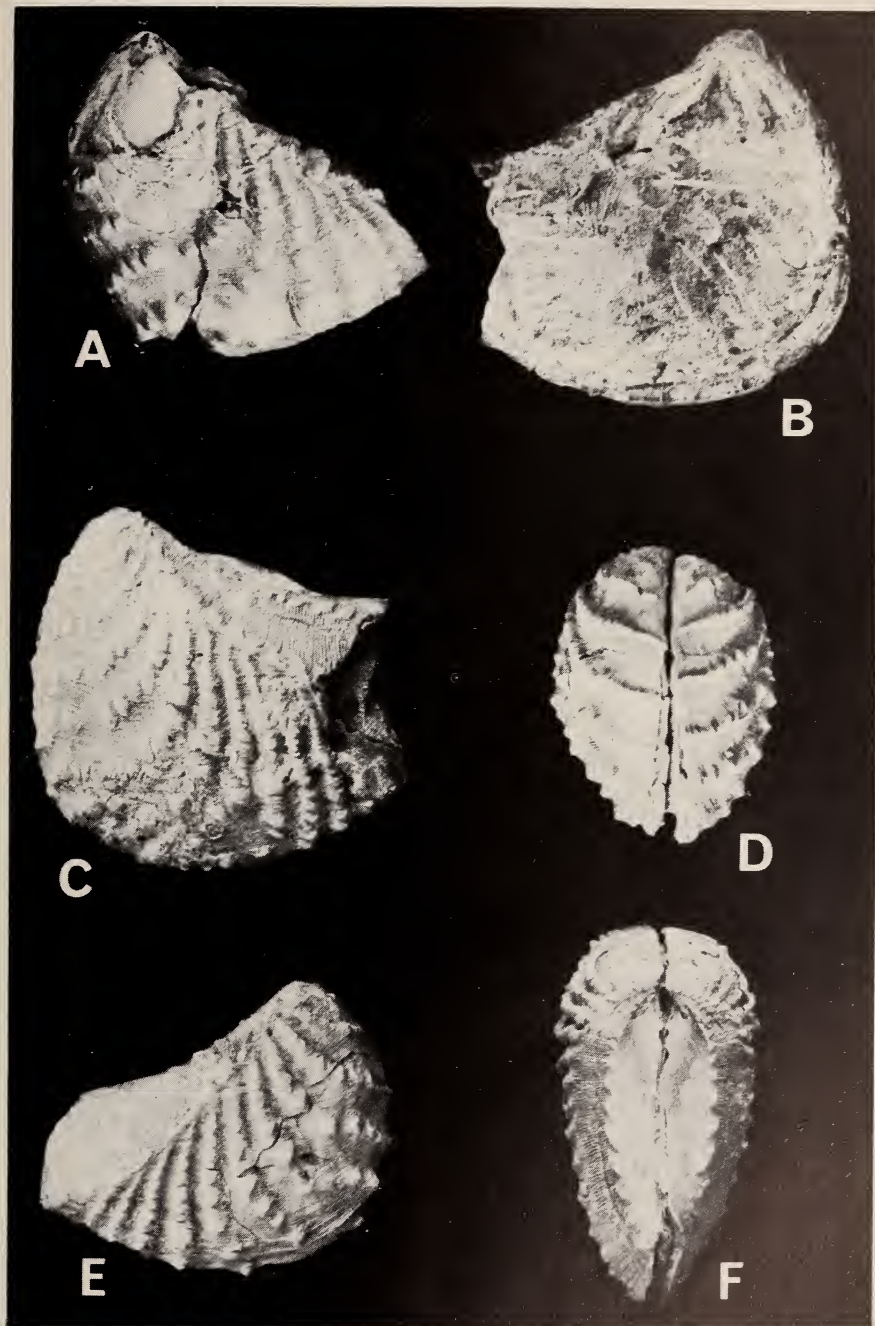


Fig. 1. *Myophorella* (*Myophorella*) *oosthuizeni* sp. nov.

A. Left valve of paratype. B-C. Interior and exterior views of left valve of paratype. D-F. Anterior, lateral and dorsal views of the holotype, R0300 (SAM-PCU5941). $\times 1,5$.

The area is trigonal, rather narrow, and ornamented by uniform, fine lirae which show no sign of increasing in strength posteriorly. The area is divided by a fine, but distinct, median longitudinal furrow which is situated much closer to the inner carina than to the marginal carina. As with the inner carina, the marginal carina is marked by a regular row of obliquely clavate tubercles which, however, converge anteriorly. The posterior margin of the area is abruptly truncate, slightly convex, and meets the dorsal margin at an angle of about 110° . Each tubercle of the marginal carina gives rise to rather weakly-developed flank ribs which, on the anterior half of the valves, curve strongly forwards so as to terminate mostly along the anterior and anteroventral margins on the commissure. From the marginal carina, the ribs are directed posteriorly, only slightly so in the nepionic growth stages but strongly so in maturity, when they meet the marginal carina at an angle of about 30° . The posterior set of ribs is almost straight. All the ribs are ornamented with prominent tubercles which are, in general, regularly spaced, although those ribs terminating along the anteroventral commissure show a distinct break in tuberculation, as well as some irregularities in their positioning. The entire surface of the flanks is ornamented by prominent, fine, concentric lirae which follow the growth lines, and are continuous with the lirae on the area.

Discussion

Amongst described species of *Myophorella*, *M. oosthuizeni* sp. nov. undoubtedly shows closest relationships with *M. alexandra* Willey (1957: 77 (fig. 2a-c)) from the Berriasian of Antarctica. *Myophorella alexandra* differs in having finely tuberculate inner and marginal carinae, and in that the transverse lirae of the area strengthen posteriorly. Moreover, in maturity, the tubercles of the marginal and inner carinae of *M. alexandra* become obsolete and are replaced by lamella protuberances. The differences are not great but, because of the different ages of the few known specimens of each species, are considered to be of specific importance.

Myophorella dekaiboda Kobayshi & Tamura (1955: 95, pl. 6 (figs 6-9)) from the Jurassic of Japan somewhat resembles the present species, but is based upon poorly preserved internal moulds and composite internal moulds which are not directly comparable with *M. oosthuizeni* sp. nov. The vastly different ages and wide geographic separation suggests that they are specifically distinct.

Cox (1965) has recently described two species of *Myophorella* from the Kimmeridgian of Tanzania, *M. quennelli* Cox (1965: 79, p. 12 (fig. 1)) and *M. kiwawaensis* Cox (1965: 80, pl. 12 (fig. 2)), but neither warrants comparison with the present form.

Myophorella kutchensis (Kitchin) (1903: 84, pl. 7 (fig 7-9)) (Fig. 2) resembles the present species, but is more ovate in outline and not produced posteriorly as much as *M. oosthuizeni* sp. nov. Moreover, the area is much wider in Kitchin's species, as well as being more coarsely lirate, whilst the tubercles of the marginal carina do not appear to be obliquely clavate as in *M. oosthuizeni*.



Fig. 2. *Myophorella (Myophorella) kutchensis* (Kitchin). The syntypes. After Kitchin (1903).
 $\times 1$.

Myophorella rupellensis (d'Orbigny) (Lycett 1872: 28, pl. 8 (fig. 4)), *M. ingens* (Lycett) (1872: 24, pl. 8 (figs 1–3)), and *M. corallina* (d'Orbigny) (Lycett 1872: 45, pl. 3 (figs 7–9, 11)) are all Jurassic species which differ from *M. oosthuizeni* sp. nov. in lacking a tuberculate marginal carina and in that the flank ribs are directed anteriorly from the marginal carina.

Myophorella mermodi (Chavan) (1952: 50, pl. 3 (fig. 5)) has a more ovate outline than *M. oosthuizeni*, with flank ribs that are directed anteriorly from the marginal carina and tubercles on the area, marking the median longitudinal furrow.

Myophorella norberti (Chavan) (= *Trigonia perlata* Lycett (non Agassiz) 1872: 22, pl. 11 (fig. 3 only)) differs from the present species in the irregular nature of the flank ribs and tubercles, and having finely tuberculate inner and marginal carinae, as well as a raised rib marking the median longitudinal furrow.

Myophorella clavellata (J. Sowerby) (Lycett 1872: 18, pl. 1 (figs 1–2)), *M. perlata* (Agassiz) (Lycett 1872: 22, pl. 3 (figs 1–3)) and *M. juddiana* (Lycett) (1872: 25, pl. 2 (fig. 6), pl. 4 (figs 5, 7)) are all Jurassic species which have a less curved anterior margin to the shell, a subquadratic outline, and finely tuberculate carinae (as well as one marking the median longitudinal furrow).

Myophorella exotica (Möricke) (1895: 49, pl. 1 (fig. 9), pl. 6 (fig. 9)) is a Bajocian species based upon composite internal moulds which may have

suffered slight distortion, and are thus difficult to compare. It differs, however, in having a finely tuberculate marginal carina.

Myophorella australiana Skwarko (1963: 38, pl. 5 (figs 8–11)) from the Aptian of Queensland differs from *M. oosthuizeni* sp. nov. in that the area and marginal carina are irregularly tuberculate, whilst most of the ribs are straight and terminate along the ventral commissure.

Myophorella alina (Contejean) (1859: 282, pl. 14 (figs 3–5)) is a Kimmeridgian species with a more coarsely ribbed area and tubercles lining the median longitudinal furrow, whilst the flank ribs are directed anteriorly from the marginal carina. The younger *M. bronni* (Agassiz) (1841: 18, pl. 5 (fig. 19)) differs from *M. oosthuizeni* in much the same features.

Myophorella signata (Agassiz) (1841: 18, pl. 3 (fig. 8), pl. 9 (fig. 5)) differs from *M. oosthuizeni* in having finely nodose carinae, including one marking the median longitudinal furrow.

Myophorella goldfussi (Agassiz) (1841: 24) (= *Lyrodon literatum* Goldfuss 1834: 200, pl. 136 (fig. 5 only)), like *M. oosthuizeni* has obliquely clavate tubercles lining the marginal carinae, but lacks the fine liration of the flanks seen in *M. oosthuizeni*, and also has tubercles lining the median longitudinal furrow.

Myophorella polonica (Lebküchner) (1933: 60, pl. 4 (fig. 5)) lacks the fine liration of the flanks seen in *M. oosthuizeni*, and also has coarser ribs on the area. *Myophorella trafalgarensis* (Warren) (1932: 18, pl. 3 (figs 5–6)) is a Callovian species which shows the same general features of *M. oosthuizeni*, especially in the nature of the flank ribs, but appears to lack tuberculate carinae.

Occurrence

Myophorella oosthuizeni is known only from the Upper Valanginian of South Africa.

SUMMARY

The new species *Myophorella oosthuizeni* from the late Valangian Sunday's River Formation provides the first record of this genus from southern Africa. It is most closely allied to *M. alexandra* Willey from the Berriasian of Antarctica.

ACKNOWLEDGEMENTS

Once again I wish to extend my best thanks to Mr R. Oosthuizen for making available to me the material in his collections.

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6. SYSTEMATIC papers must conform to the *International code of zoological nomenclature* (particularly Articles 22 and 51).

Names of new taxa, combinations, synonyms, etc., when used for the first time, must be followed by the appropriate Latin (not English) abbreviation, e.g. gen. nov., sp. nov., comb. nov., syn. nov., etc.

An author's name when cited must follow the name of the taxon without intervening punctuation and not be abbreviated; if the year is added, a comma must separate author's name and year. The author's name (and date, if cited) must be placed in parentheses if a species or subspecies is transferred from its original genus. The name of a subsequent user of a scientific name must be separated from the scientific name by a colon.

Synonymy arrangement should be according to chronology of names, i.e. all published scientific names by which the species previously has been designated are listed in chronological order, with all references to that name following in chronological order, e.g.:

Family Nuculanidae

Nuculana (*Lembulus*) *bicuspidata* (Gould, 1845)

Figs 14–15A

Nucula (*Leda*) *bicuspidata* Gould, 1845: 37.

Leda plicifera A. Adams, 1856: 50.

Laeda bicuspidata Hanley, 1859: 118, pl. 228 (fig. 73). Sowerby, 1871: pl. 2 (fig. 8a–b).

Nucula largillierti Philippi, 1861: 87.

Leda bicuspidata: Nickles, 1950: 163, fig. 301; 1955: 110. Barnard, 1964: 234, figs 8–9.

Note punctuation in the above example:

comma separates author's name and year

semicolon separates more than one reference by the same author

full stop separates references by different authors

figures of plates are enclosed in parentheses to distinguish them from text-figures

dash, not comma, separates consecutive numbers

Synonymy arrangement according to chronology of bibliographic references, whereby the year is placed in front of each entry, and the synonym repeated in full for each entry, is not acceptable.

In describing new species, one specimen must be designated as the holotype; other specimens mentioned in the original description are to be designated paratypes; additional material not regarded as paratypes should be listed separately. The complete data (registration number, depository, description of specimen, locality, collector, date) of the holotype and paratypes must be recorded, e.g.:

Holotype

SAM-A13535 in the South African Museum, Cape Town. Adult female from mid-tide region, King's Beach Port Elizabeth (33°51'S 25°39'E), collected by A. Smith, 15 January 1973.

Note standard form of writing South African Museum registration numbers and date.

7. SPECIAL HOUSE RULES

Capital initial letters

- The Figures, Maps and Tables of the paper when referred to in the text
e.g. '... the Figure depicting *C. namacolus* ...'; '... in *C. namacolus* (Fig. 10) ...'
- The prefixes of prefixed surnames in all languages, when used in the text, if not preceded by initials or full names
e.g. Du Toit but A. L. du Toit; Von Huene but F. von Huene
- Scientific names, but not their vernacular derivatives
e.g. Therocephalia, but therocephalian

Punctuation should be loose, omitting all not strictly necessary

Reference to the author should be expressed in the third person

Roman numerals should be converted to arabic, except when forming part of the title of a book or article, such as

'Revision of the Crustacea. Part VIII. The Amphipoda.'

Specific name must not stand alone, but be preceded by the generic name or its abbreviation to initial capital letter, provided the same generic name is used consecutively.

Name of new genus or species is not to be included in the title: it should be included in the abstract, counter to Recommendation 23 of the Code, to meet the requirements of Biological Abstracts.

MICHAEL R. COOPER

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